

Addendum to the Environmental Assessment
for the
Homeland Defense Technologies and Security Readiness Center

RDECOM-ARDEC, Picatinny Arsenal, New Jersey

Third Addendum Environmental Assessment
for the
Conduct of Behavioral Response Testing and Evaluation by the Target Behavioral
Response Laboratory (TBRL) - Outdoor Behavioral Response Tests at ARDEC's Helipad
with 12 Gauge Shotgun Shell and 40mm Flash Bang Simulators

RDECOM-ARDEC, Picatinny Arsenal, New Jersey

Submitted to:



August 2011

Prepared For:

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SIGNATURES AND APPROVAL

REPORT OF ENVIRONMENTAL ASSESSMENT RDECOM-ARDEC, PICATINNY ARSENAL PICATINNY ARSENAL, NEW JERSEY

U.S. Army Research, Development and Engineering Command – Armament Research,
Development, and Engineering Center (RDECOM-ARDEC)

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SIGNATURES AND APPROVAL (continued)

**REPORT OF ENVIRONMENTAL ASSESSMENT
RDECOM-ARDEC, PICATINNY ARSENAL
PICATINNY ARSENAL, NEW JERSEY**

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EXECUTIVE SUMMARY

Conduct of Behavioral Response Testing and Evaluation by the Target Behavioral Response Laboratory (TBRL) - Outdoor Behavioral Response Tests at ARDEC's Helipad With 12-Gauge Shotgun Shell and 40mm Flash-Bang Simulators

This third addendum to the environmental assessment (EA) for the Construction of a Homeland Defense Technologies and Security Readiness Center (Reference 1) was prepared to evaluate the potential impacts on the physical and human environment from the proposed action to conduct outdoor behavioral response testing and evaluation at the ARDEC Helipad using shotgun shell-sized and 40mm-sized flash/bang simulator munitions. The 12 Gauge shotgun shell-sized flash/bang simulator munitions contain 3.5 grams of energetic material, and the 40mm flash/bang simulator munitions contains 6.96 grams of similar energetic material. Refer to Appendix B of this EA for a combustion product analysis of the 12 Gauge and 40mm warning munitions.

Phase 1 of the TBRL Outdoor Behavioral Response Testing consisted only of the Intelligent Munitions Systems (IMS) Non-Lethal Pyrotechnic Capabilities Test. This test was conducted between August - September 2009.

Phase 2 of the TBRL Outdoor Behavioral Response Testing consisted of additional behavioral response testing using laser light and strobe light stimuli simultaneously with sound generation devices, as well as paint balls in a series of ongoing experiments conducted between October 2009 and the present (March 2011).

TBRL expects to continue beyond 2011 and into the next few years with experiments/tests involving the use of the same paintballs, and the same visual and auditory stimuli as the Phase 1 tests conducted in 2009. There may be some differences in the experiments (e.g., configuration of stimuli on the test course in full compliance with safety document advisories, quantity of paintballs to be shot), but the same stimuli and paintballs will be used.

TBRL has been tasked to conduct outdoor behavioral response tests at the former ARDEC Helipad to assess the behavioral response of test subjects to shotgun shell-sized flash and bang simulator munitions while performing task-oriented driving maneuvers (e.g., approaching a mock vehicle control point). All of the proposed activities will be confined to paved areas of the former helipad. One 12 Gauge or 40mm simulator munition will be set up at the center of the X as can be seen in figure 1. For each human research volunteer, one and only one energetic will be detonated. The current TBRL plan is to conduct the testing during FY12 over an approximate 12-week period during daylight and evening hours, and to conduct a maximum of 5 tests daily (3 daytime, 2 nighttime), with a maximum of 5 warning munition detonations per day.

Figure 1 shows a depiction of the setup. Empty Jersey barriers will be placed along the course boundary to prevent vehicles from veering off course. Additionally, water filled

barriers will be placed between the course and the warning munitions to prevent the vehicle (and its occupant) from ever getting closer than the established standoff distance of 50ft.

These tasks are required by the Army, and will be conducted by the TBRL of the Quality Engineering and System Assurance Directorate (QE&SA), at the former ARDEC Helipad located near the 3500 Area of RDECOM-ARDEC.

The underlying need for the proposed action is to enhance the Warfighter's performance and survivability during the performance of vehicular negotiation around a prescribed course and thereby ensuring knowledge of threat assessment under stress, as provided by flash and bang simulator munitions while performing task-oriented driving scenarios, and mock tactical checkpoint operational scenarios. The following alternatives, designed to meet the purpose and underlying need, are evaluated in this 3rd Addendum EA.

- ☐ **Preferred Alternative:** The preferred alternative is the proposed action – to conduct the proposed driving tests around a prescribed course with pre-placed flash and bang simulator munitions at the former NJARNG Helipad.
- ☐ **No Action Alternative:** The no action alternative would be not to conduct the aforementioned Phase 3 Helipad driving testing and evaluation, which would not satisfy the stated purpose and need. This alternative is entirely unacceptable due to increased danger to Soldier and Homeland Security Force personnel resulting from behavioral response uncertainty under simulated stress and threat assessment conditions, and consequent increased Soldier and Homeland Security Force personnel vulnerability.
- ☐ **Alternatives Considered and Rejected:** An alternative considered and rejected was to conduct the proposed test at a different location than the ARDEC Helipad. This alternative was rejected because there are no other suitable locations at ARDEC capable of supporting the proposed test. The existing TBRL test facility infrastructure and potential availability of a large level paved piece of land at the former helipad located adjacent to Building 3518 of the TBRL facility away from the normal working environment of the Arsenal was considered to be the only feasible alternative.

Analysis of impacts on current air resources; water resources; soil and geologic resources; biological resources; cultural, historical, and aesthetic resources; the socioeconomic environment and environmental justice; hazardous materials; and hazardous waste/solid waste, was conducted to determine if the proposed action would adversely impact any of those resources. This EA concludes that the proposed action would not have any significant adverse impacts on the resources examined herein. The proposed action may cause minor adverse impacts on several resources of the proposed site, but those impacts would be insignificant and would be reduced through the implementation of a variety of protective measures and best management practices. Therefore, the preparation of a Notice of Intent (NOI) to prepare an environmental impact statement (EIS) is not warranted at this time. This decision will be documented through a finding of no significant impact (FNSI).

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

This 3rd EA addendum was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), (Title 42 of the United States Code [U.S.C.] 4321 through 4347); the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (Title 40 of the Code of Federal Regulations [CFR] parts 1500 through 1508) for Army Actions; *Protection of the Environment*, Code of Federal Regulations (40 CFR, part 280); U.S. Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*; AR 200-2, *Environmental Effects of Army Actions*, as set forth in 32 Code of Federal Regulations (CFR) Part 651 (Final Rule), dated 29 March 2002; and AR 200-3, *Natural Resources – Land, Forest, and Wildlife Management*.

2.0 GENERAL DESCRIPTION OF PROPOSED ACTION

The proposed driving tests at the ARDEC Helipad are being planned as part of the Joint Non-Lethal Munitions Effectiveness (JNLME) Project. The overall goal of the JNLME Project is to develop non-lethal weapon (NLW) system characteristics, performance, and effectiveness estimates with the intended use in models & simulations. This data will help fuel the development of improved military tactics, techniques, and procedures. To date, the Joint Technical Coordinating Group for Munitions Effectiveness (JTCEG/ME) has developed and fielded numerous non-lethal technologies which are currently in use by trainers and mission planners and is in the process of accrediting an initial (limited capability) Joint Non-Lethal Assessment Tool (JNLAT). Figure 1 is an aerial depiction of the proposed test track layout. The proposed activities will take place entirely on paved surfaces at the former helipad and will not require any disturbance to soil nor trees nor other natural resources.

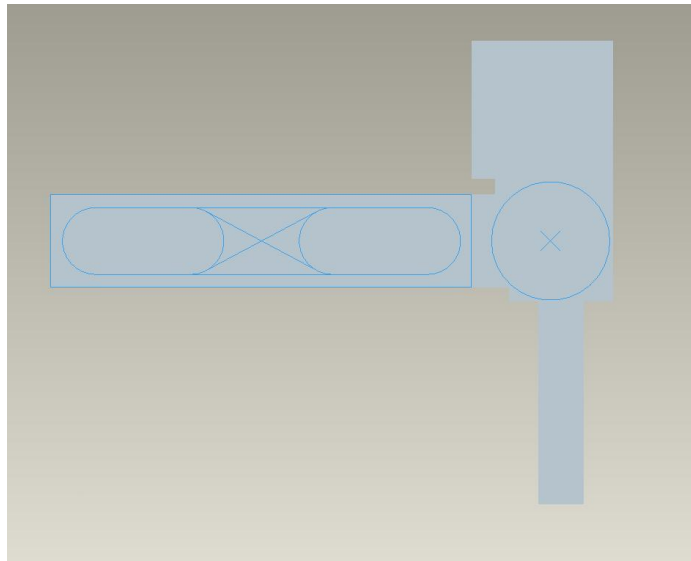


Figure 1 – Aerial Depiction of Test Track for Proposed Phase 3 Experiments at Former Helipad

The hailing and warning of civilians who accidentally approach controlled or restricted areas present a need for a universal clear and unambiguous signal to effectively filter oblivious drivers from those with malicious intent. With this application in mind, the 12-gauge and 40mm warning flash/bang munitions were developed to elicit a response from even the most distracted drivers. The proposed vehicle maneuver response testing at the former helipad will examine the effectiveness of these rounds in hailing and warning approaching drivers. During the proposed experiment, drivers will not necessarily be exclusively focused on perceiving hail/warn signals as they will be randomly subjected to everyday distractions such as: adjusting the radio, adjusting the heat/air conditioner, conversing with passengers, driving during poor visibility and road conditions, and also using cell telephones, and even sending/receiving text messages. The overall data collected from this effort will be analyzed as part of the JNLME Project for inclusion into the JNLAT.

In preparation for the proposed vehicle maneuver response testing at the former helipad, extensive safety testing was performed in July 2010 in a collaborative effort between the TBRL, US Army Public Health Command (USAPHC), ARDEC's Industrial Hygiene Office and ARDEC's Munitions and Ballistics Team, to determine a safe standoff distance from the 12-gauge and 40mm warning munitions, based on analysis of debris scatter from function of the warning munitions. After additional arena testing in October 2010 was conducted with no observed penetration through, or damage to, vehicle components, a safe standoff distance of 50 feet was established. To ensure the safety of test subjects, the TBRL will initiate the warning munitions statically from a grounded device in strict accordance with SOPs. Simulators will be suspended 4 feet from the ground. TBRL test operator personnel will wear appropriate personnel protective equipment (e.g., Kevlar vest, eye and face protection, and hearing protection) at all times when within the 50-foot safe standoff distance.

The proposed action involves the conduct of outdoor behavioral response tests at the former helipad to assess the behavioral response of test subjects to no stimuli, then to shotgun shell-sized flash and bang simulator munitions while performing task-oriented driving maneuvers (e.g., approaching a mock vehicle control point, and negotiating a chicane), and also to include driving golf cart-type vehicles around a prescribed marked Figure "8" test course set up at the former helipad. One 12-gauge or 40mm flash and bang simulator, with a 50-foot safety danger distance, will be placed at the location marked "X". The proposed action may cause minor adverse impacts on several resources of the proposed site, but those impacts would be insignificant and would be reduced through the implementation of a variety of protective measures and best management practices. These best management practices include the collection and proper disposal of all spent rounds and other debris at the end of each day that testing activities are conducted. In addition, test activities will be confined to the paved area of the former helipad.

It is noted that the 50-foot safety danger distance is larger than the radius of the "compliance volume" of combustion products from 12-gauge or 40mm Warning Munition function (5.5914 meters (18.344 feet) and 7.03774 meters (23.089 feet), respectively). Refer to Appendix B for further details.

The current TBRL plan is to conduct the testing over an approximate 12-week period during daylight and evening hours, and to conduct a maximum of 5 tests daily (3 daytime, 2 nighttime), with a maximum of 5 warning munition detonations per day.

The best way to ensure soldiers' survivability and enhanced performance is to ensure compliance with orders/commands issued by checkpoint operators and to keep aggressive combatants away from them. Placement of sound, light, and projectile stimuli generators in the control of checkpoint operators present a simple, cost-effective way to achieve these objectives. The TBRL is conducting and will continue to conduct the human behavioral response testing and evaluation, and will provide the Army with the data needed to make informed decisions as to the placement and use of sound generation, light generation, and tactical projectile delivery devices. As the TBRL has most of the infrastructure in place for this type of experimentation, only minimal additions to the measurement gathering systems need to be implemented or installed before the experimental testbed is ready for testing.

This task is required by the Army, and will be completed by the TBRL of the Quality Engineering and System Assurance Directorate (QE&SA), in outdoor locations within the 3800-area of Picatinny Arsenal on the former helipad tarmac only of Picatinny Arsenal.

3.0 ALTERNATIVES CONSIDERED

- ☐ **Preferred Alternative:** The preferred alternative is the proposed action – to conduct the proposed driving tests around a prescribed course with pre-placed flash and bang simulator munitions at the former NJARNG Helipad.
- ☐ **No Action Alternative:** The no action alternative would be not to conduct the aforementioned Phase 3 Helipad driving testing and evaluation, which would not satisfy the stated purpose and need. This alternative is entirely unacceptable due to increased danger to Soldier and Homeland Security Force personnel resulting from behavioral response uncertainty under simulated stress and threat assessment conditions, and consequent increased Soldier and Homeland Security Force personnel vulnerability.
- ☐ **Alternatives Considered and Rejected:** An alternative considered and rejected was to conduct the proposed test at a different location than the ARDEC Helipad. This alternative was rejected because there are no other suitable locations at ARDEC capable of supporting the proposed test. The existing TBRL test facility infrastructure and potential availability of a large level paved piece of land at the former helipad located adjacent to Building 3518 of the TBRL facility away from the normal working environment of the Arsenal was considered to be the only feasible alternative.

4.0 AFFECTED ENVIRONMENTS

The affected environments from the proposed TBRL Outdoor Behavioral Response Testing at ARDEC's Helipad are incorporated by reference to the existing approved environmental assessment document entitled "Environmental Assessment (EA) for the Construction of a Homeland Defense Technologies and Security Readiness Center, dated May 2003" (Reference 1). Further analysis of the affected environments from the proposed TBRL Outdoor Behavioral Response Testing at ARDEC's Helipad is set forth below:

Table 1 - Valued Environmental Components for Analysis

Valued Environmental Component	Anticipated Impact (proposed action)	Anticipated Impact (no action alternative)
Aesthetics	No impact	No impact
Airspace	No impact. In regards to light stimuli generated from the 12-gauge and 40mm warning munitions, a nominal ocular hazard distance (NOHD) of 1 meter has been established.	No impact
Noise	Minor impact. There will be minor noise impacts from operation of the 12-gauge and 40mm flash/bang warning munitions during the TBRL Outdoor Behavioral Response Testing at the proposed site.	No impact
Traffic and Transportation	No impact. No negative impact was observed during previously conducted outdoor testing at the TBRL, and no negative impact is foreseen from the proposed conduct of Phase 3 TBRL Outdoor Behavioral Response Testing.	No impact
Wetlands	No impact.	No impact
Natural Resources	No adverse effect on wildlife including Indiana Bat and no significant impact to flora and fauna that border weapon firing positions, from the performance of a limited number of munitions firings.	No impact
Recreation	No impact	No impact
Socioeconomics	No impact	No impact
Environmental Justice	No impact on minority or low-income populations or communities	No impact
Soil Contamination / Soil Erosion	No impact. The proposed action will be contained to the	No impact

	paved area of the former helipad. Spent shells and debris will be collected and properly disposed at the end of each day tests are conducted.	
Hazardous Material/Hazardous Waste	No impact. The proposed action will be contained to the paved area of the former helipad. Spent shells and debris will be collected and properly disposed at the end of each day tests are conducted.	No impact
Cultural Resources	No impact. Per Reference 1, according to Picatinny Arsenal records, the 3800 Area has been identified as disturbed slope, with a low likelihood of cultural artifacts.	No impact
Water Resources	No impact. The proposed site is not located in an area with water features.	No impact
Air Quality	Minor impact	No impact
Solid Waste	No impact.	No impact
Floodplains	No impact.	No impact

5.0 Environmental Consequences of the Proposed Action and Alternatives

5.1 Air Quality

Air impacts have been observed to be minimal to nonexistent during previous conduct of Outdoor Behavioral Response Testing by the TBRL. There will be a limited amount of airborne exhaust releases from operation of gasoline powered and diesel fuel powered test support vehicles, and also gasoline and diesel fuel powered generators, during the proposed conduct of the TBRL Phase 3 Outdoor Behavioral Response Testing at the ARDEC Helipad.

Per discussion with TBRL representatives, the afore-mentioned gasoline and diesel fuel powered generators an exemption for operation by TBRL without a formal permit has been provided by the ARDEC Environmental Affairs Division.

There will also be airborne releases generated during operation of the 12-gauge and 40mm warning munitions during the conduct of the proposed Phase 3 Outdoor Behavioral Response Testing at the former helipad. The low-toxicity combustion products are determined to occupy "compliance volumes" corresponding to radii of less

than 50 feet from the warning munitions initiation location. Refer to Appendix B for additional information.

Implementing the no action alternative would have no effect on the air quality at the proposed site.

5.2 Noise

There will be minor noise impacts from operation of the 12-gauge and 40mm flash/bang warning munitions during the TBRL Outdoor Behavioral Response Testing at ARDEC's Helipad. The sound generation device to be employed by TBRL during the proposed Phase 3 Outdoor testing at the proposed site would include 12-gauge and 40mm flash/bang warning munitions. The 12-gauge and 40mm warning munitions emit maximum noise pulses of an average 135.2 dBA for the 12-gauge munitions, and 136.2 dBA for the 40mm munitions, at a distance of 150 feet. Further testing conducted in October 2010 to assess the noise dampening effect of the test vehicle windshield led to a revised standoff distance of 25 feet.

No adverse environmental impacts have been identified for the sound devices proposed for use by the TBRL for the Phase 3 Behavioral Testing at the former helipad. A Record of Non-Applicability (RONA) was prepared in support of the sound device use which shows the emissions generated will not exceed compliance thresholds. Refer to Appendix B for a combustion product analysis for the 12-gauge and 40mm flash/bang warning munitions for additional information.

Implementing the no action alternative would have no effect on the noise quality at the proposed site.

5.3 Natural Resources/Endangered Species

Roost sites for the federally-listed endangered Indiana bat are known to have existed in August 1997 at Picatinny Arsenal lands bordering the 3518 area, based on capture and release data provided by ARDEC volunteer personnel in early September 1997. It has also been determined that the Ballistic Rail Gun facility located approximately 260 meters from the known Indiana Bat roost site was operated at least 4 times firing 155mm munitions with M4A2 bagged propelling charges during August 1997.

It was concluded that the operation of the Ballistic Rail Gun in August 1997 did not have an adverse effect on a known Indiana Bat roost site that was still occupied in early September 1997.

It was also concluded that the 12-gauge and 40mm warning munitions, with respective average measured noise signatures of 135.2 dBA and 136.2 dBA at a distance of 150 feet (45.72 meters) from the initiation location, will not adversely affect identified bat roosting sites located 536 meters (1758.53 feet) from the initiation location. Refer to Figure 2 of this document.

Earlier work performed at Fort Knox, KY in 2002 to ascertain the impact of large caliber (e.g., 105mm/155mm projectiles) munitions firings conducted during daytime and

nighttime hours on bat populations at Fort Knox was documented in Jan 2004, and concluded that “there is no significant impact to flora and fauna that border weapon firing positions, from the performance of a limited number of munitions firings.” Refer to the Reference 13 document entitled “2nd Addendum to the Environmental Assessment for Homeland Defense Technologies and Security Readiness Center”, dated May 2010, for further information.

Implementing the no action alternative would have no effect on the natural resources or endangered species at the proposed site.

5.4 Storm Water

A stormwater pollution prevention plan will be prepared by IMNE-PIC-PWE with input from TBRL and the site operations will adhere to the requirements of the plan. Additional best management practices may be identified in the development of the stormwater pollution prevention plan.

Also, the TBRL has advised that testing will not be conducted during adverse weather conditions (e.g., rain) (Reference 13).

No munitions cartridges or other items from the test will be anticipated to be found off the tarmac (paved surface). Combustion product residues in run-off from function of simulator munitions during the proposed Phase 3 TBRL tests at the Helipad are anticipated to be negligible. One shotgun shell or 40mm simulator will be fired during each Phase 3 TBRL test run, and the simulator will be located 4 to 5 feet off the ground over the tarmac at the Helipad. The TBRL Test Director for the proposed Phase 3 Helipad testing has informed us that there will be a daily cleanup of solid debris from function of the simulator munitions, mainly paper and plastic shards, during the conduct of the Phase 3 testing. If necessary, the TBRL will prepare a Standard Operating Procedure (SOP) for the daily debris clean-up operations to be performed during the conduct of the Phase 3 testing (Reference 13).

Implementing the no action alternative would not affect stormwater quality or control at the proposed site.

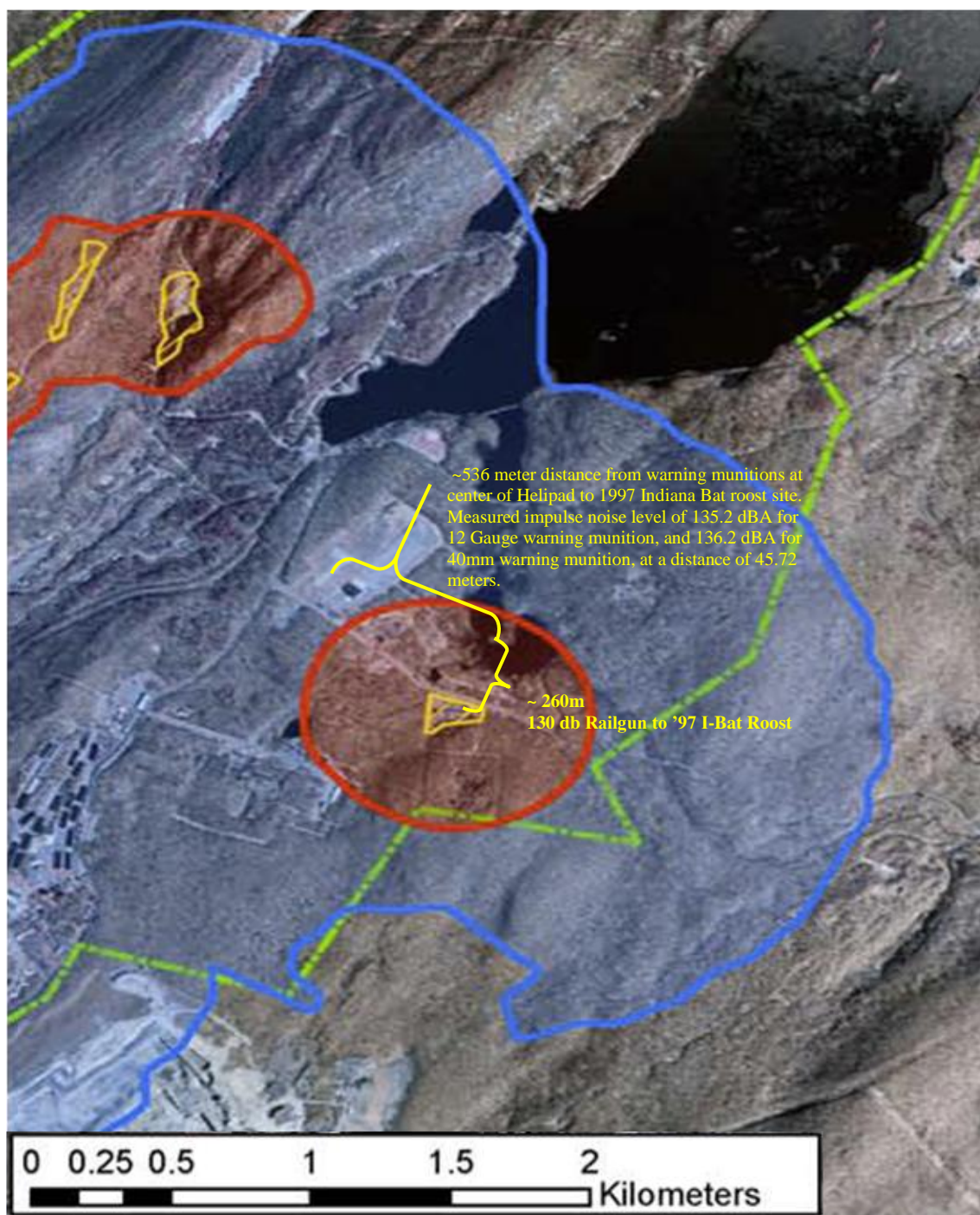


Figure 2 – Comparison of Distances Between ARDEC Ballistic Rail Gun to 1997 Indiana Bat Roost Site (260 Meters) and Distance From Center of ARDEC Helipad to 1997 Indiana Bat Roost Site (536 Meters)

6.0 Conclusions

A review of the Building 3518 Stormwater Control Plan, Operator Manuals, Specification Sheets, and MSDSs for the proposed 12 Gauge and 40mm Warning Munitions to be

used during the proposed Phase 3 Outdoor Behavioral Response Testing and evaluations by TBRL at the ARDEC Helipad identifies that all materials are toxicologically and environmentally acceptable, and that documented mandated procedures for daily clean-up of 12 Gauge and 40mm Warning Munition residue are in place (References 3 and 12).

No adverse environmental impacts have been identified for the combustion products predicted to be generated from function of 12 Gauge and 40mm Warning Munitions proposed for use by the TBRL during the proposed Phase 3 Outdoor Behavioral Response Testing at the ARDEC Helipad.

Therefore, the preparation of a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) is not warranted at this time. This decision is documented in the Finding of No Significant Impact (FNSI) submitted as an attachment to this EA.

7.0 Organizations and Persons Contacted

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Darrell Evans, Waterways Experiment Station
Chester Martin, Waterways Experiment Station

8.0 References

1. Environmental Assessment (EA) for the Construction of a Homeland Defense Technologies and Security Readiness Center, dated May 2003.
2. Picatinny Arsenal Real Property Master Plan, Figure 5-2, Natural Constraints.
3. Memorandum for TBRL, dated 28 July 2010, Subject: Preliminary Results From Hazard Analysis Testing of 40mm and 12 Gauge Joint Non-Lethal Warning Munitions, by E.C. Brumage, Physicist, ARDEC's Laser/Optical Radiation Program
4. 2nd Addendum to Environmental Assessment (EA) for the Homeland Defense Technologies and Security Readiness Center, dated May 2010

5. The Clemson University Cooperative Extension Service – Fertilizing Lawns
6. Soil "Microsoft™ Encarta Online Encyclopedia 2001 <http://Encarta.msn.com>
Copyright 1997 - 2001 Microsoft Corporation. All rights reserved.
7. Human Research Protection Plan (HRPP), dated 9 May 2008 (ARDEC-HRPP-08000)
8. USCOE-WES Report entitled "An Investigation of Military Training Noise Impacts on Endangered Bats", dated 5 January 2004
9. Building 3518 Stormwater Control Plan, last updated on 9 July 2009, Picatinny Arsenal Environmental Management Systems Portal
10. Email, Mr. K. Tevis, TBRL, to Mr. J. Dowden, 19 Mar 10, Subject: TBRL Nighttime Testing
11. Email, Deputy Chief Mertz to J. Dowden, dated 28 March 2011, Subject: Question on Prior Operation of Picatinny's Ballistic Rail Gun for TBRL's Helipad EA
12. Second TBRL EA, dated May 2010.
13. Email, Mr. K. Tevis, TBRL, to Mr. J. Dowden, 1 August 2011, Subject: RE: TBRL EA – 3rd Addendum.

9.0 Acronyms

A

AAQS	Ambient Air Quality Standards
ACGIH	American Conference of Governmental Industrial Hygienists
AR	Army Regulation

B

C

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHPPM	US Army Center for Health Promotion and Preventive Medicine
CNS	Central Nervous System
CVS	Cardiovascular System

D

D&ETD	Demilitarization & Environmental Technology Division
DoD	Department of Defense
DPW	Department of Public Works
DTP	Detailed Test Plan

E

EA	Environmental Assessment
EASB	Environmental Acquisition Support Branch
ECBC	Edgewood Chemical Biological Center
EIS	Environmental Impact Statement
EMS	Emergency Medical System
EPA	Environmental Protection Agency
ES	Executive Summary
ESOH	Environment, Safety and Occupational Health
EWMTD	Energetics, Warheads and Manufacturing Technology Directorate

F

FNSI	Finding of No Significant Impact
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G

H

HAZMAT	Hazardous Material
HRPP	Human Resource Protection Plan

ACRONYMS (continued)

I

IARC	International Agency for Review on Cancer
IMS	Intelligent Mine System
IRB	Institutional Review Board

J

JNLAT	Joint Non-Lethal Assessment Tool
JNLME	Joint Non-Lethal Munitions Effectiveness
JTCG/ME	Joint Technical Coordinating Group for Medical Effectiveness

K

L

LRT	Lower Respiratory Tract
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M

METC	Munitions Engineering Technology Center
MMAD	Mass Median Aerodynamic Diameter
MSDS	Material Safety Data Sheet

N

NAAQS	National Ambient Air Quality Standards
ND	Not Detected
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NJDEP	New Jersey Department of Environmental Protection
NOHD	Nominal Ocular Hazard Distance
NOI	Notice of Intent
NOSD	Nominal Skin Hazard Distance
NTP	National Toxicology Program

O

OSHA	Occupational Safety and Health Administration
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ACRONYMS (continued)

P

PEL	Permissible Exposure Level
PHC	US Army Public Health Command (formerly CHPPM)
PM _{2.5}	Particulate Matter of 2.5 Microns or Less
PM ₁₀	Particulate Matter of 10 Microns or Less
ppb	Parts Per Billion
ppm	Parts Per Million

Q

QE&SA	Quality Engineering & System Assurance Directorate
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R

RDECOM-ARDEC	Research, Development and Engineering Command - Armament Research, Development and Engineering Center
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S

SAR	Safety Assessment Report
SOP	Standard Operating Procedure
STEL	Short Term Exposure Limit
SWAT	Special Weapons and Tactics

T

TBRL	Target Behavioral Response Laboratory
TPY	Tons Per Year
TWA	Time Weighted Average

U

URT	Upper Respiratory Tract
USC	United States Code

V

W

WES	Waterways Experiment Station
-----	------------------------------

X

Y

YPG	Yuma Proving Ground
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Z

APPENDIX A

Roll-up of Toxicology Information, Threshold Limit Value (TLV) Information as Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH), and Environment, Safety and Occupational Safety and Health (ESOH) Information for Energetic Materials Contained in 12-Gauge and 40mm Warning Munitions Proposed for Use During Phase 3 TBRL Experiments at the ARDEC Helipad

Table A-1 (continued) – Roll-up of Toxicology Information, ACGIH-Compiled TLV Information, and Environmental, Safety and Occupational Health (ESOH) Information for Energetic Ingredients Contained in 12 Gauge and 40mm Warning Munitions Proposed for Use During Phase 3 TBRL Experiments at the ARDEC Helipad

<u>Composition / Constituents</u>	<u>National Toxicology Program (NTP)</u>	<u>ACGIH Threshold Exposure limits/OEL (8-Hour TWA)</u>	<u>IARC Threshold Exposure limits</u>	<u>NIOSH Threshold Exposure Limits/ TWA</u>	<u>Carcinogenicity / Animal Studies, & Incompatibilities</u>	<u>OSHA mg/m³ Threshold Exposure limits / PEL Carcinogen* & Note(s) on Flammability</u>	<u>Suggested PPE</u>	<u>Notes; (e.g., Disposal/ Transportation DOT/International Considerations) Health Hazards: Exposure Routes (ER), symptoms (SY), target organs (TO)</u>
Magnesium (forms MgO from function of 12 Gauge or 40mm Warning Munitions)	No	10 mg/m ³ (for MgO)	None	None	<p>No animal studies identified investigating adverse effect of magnesium ingestion, inhalation, or dermal absorption.</p> <p>Animal studies have shown that a deficiency in magnesium can lead to sleep disturbances, and also cause heart muscle damage and subsequent heart failure.</p> <p>Magnesium deficiencies have also been linked to osteoporosis.</p>	None	<p>Use in adequately ventilated area.</p> <p>For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible or not performing sufficiently, a particulate respirator (NIOSH Type N95 or better filters) may be worn. If oil particles (e.g., lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH Type R or P filter. For emergencies or where exposure levels are not known, use full-face positive-pressure, air-supplied respirator.</p> <p>Skin: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.</p> <p>Eyes: Use chemical safety goggles, and/or face shield where dusting or splashing of solutions is possible. Maintain eyewash fountain and quick-drench facilities in area.</p>	<p>Inhalation: Inhalation of dusts or fumes may irritate the respiratory tract and cause metal fume fever, symptoms: Coughing, chest pain, fever, leukocytosis. First Aid: Remove to fresh air, get medical attention for any breathing difficulty.</p> <p>Ingestion: Mg metal does not have well-characterized toxicity. May cause abdominal pain and diarrhea. First Aid: DO NOT INDUCE VOMITING. Give large amounts of water, get immediate medical attention.</p> <p>Skin contact: Particles embedded in skin may cause eruptions. Molten magnesium may cause severe skin burns. Remove contaminated clothing, wash skin with mild detergent or soap for ≥ 15 minutes. Get medical attention if irritation develops or persists.</p> <p>Eye: High concentrations of dust may cause mechanical irritation. Watching a magnesium fire can cause eye injury. First Aid: Immediately flush eyes with plenty of water for ≥ 15 minutes, lifting both eyelids occasionally. Get medical attention if condition persists.</p> <p>Pre-existing Conditions: Existing wounds contaminated with magnesium are very slow to heal.</p> <p>Storage: Keep in tightly closed container, stored in cool, dry, ventilated area. Protect against physical damage. Store finely divided powder, chips or shavings in detached fire-resistant building, protected from moisture and away from oxidizers, chlorine, bromine, iodine, acids, and all possible sources of ignition. Containers of this material may be hazardous when empty since they retain product residues (dust, solids, vapors, liquid); observe all warnings & precautions listed for the product. Accidental release: Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Sect.8. Solid Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools & equipment. Reduce airborne dust & prevent scattering by moistening w/ water. Pick up spill for recovery or disposal & place in a closed container. Liquid Spills: Absorb w/ vermiculite, dry sand, earth or similar material & place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer.</p>

Table A-1 (continued) – Roll-up of Toxicology Information, ACGIH-Compiled TLV Information, and Environmental, Safety and Occupational Health (ESOH) Information for Energetic Ingredients Contained in 12 Gauge and 40mm Warning Munitions Proposed for Use During Phase 3 TBRL Experiments at the ARDEC Helipad

<u>Composition / Constituents</u>	<u>National Toxicology Program (NTP)</u>	<u>ACGIH Threshold Exposure limits/OEL (8-Hour TWA)</u>	<u>IARC Threshold Exposure limits</u>	<u>NIOSH Threshold Exposure Limits/ TWA</u>	<u>Carcinogenicity / Animal Studies, & Incompatibilities</u>	<u>OSHA mg/m³ Threshold Exposure limits / PEL Carcinogen* & Note(s) on Flammability</u>	<u>Suggested PPE</u>	<u>Notes; (e.g., Disposal/ Transportation DOT/International Considerations) Health Hazards: Exposure Routes (ER), symptoms (SY), target organs (TO)</u>
Aluminum (forms Al ₂ O ₃ from function of 12 Gauge or 40mm Warning Munitions)	No	1 mg/m ³ OSHA Calls For a STEL PEL of 15 mg/m ³ , and a TWA PEL of 5 mg/m ³ , and an allowable respirable fraction of 10 mg/m ³ .	None	None	No LD ₅₀ nor LC ₅₀ information found relating to normal routes of occupational exposure.	None	<p>A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits.</p> <p>For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible or not performing sufficiently, a particulate respirator (NIOSH Type N95 or better filters) may be worn. If oil particles (e.g., lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH Type R or P filter. For emergencies or where exposure levels are not known, use full-face positive-pressure, air-supplied respirator.</p> <p>Skin: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.</p> <p>Eyes: Use chemical safety goggles, maintain eyewash fountain and quick-drench facilities in area.</p>	<p>Inhalation: Causes irritation to respiratory tract, symptoms may include shortness of breath, coughing, inhalation. First Aid: Remove to fresh air, give artificial respiration, if breathing difficult give oxygen, get medical attention. Ingestion: Not considered toxic although aluminum chloride may form slowly in the digestive tract, causing nausea, vomiting, other gastrointestinal effects in extreme cases. First Aid: Give several glasses of water to dilute, if large amounts were swallowed, get medical attention. Accidental Release Measures: Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Use non-sparking tools and equipment. Avoid contact with water. Skin: May cause irritation with redness & pain, wash affected areas with soap + water, get medical attention if irritation develops.</p> <p>Eyes: Causes redness, irritation. And pain. First Aid: Immediately flush eyes for > 15 minutes lifting both eyelids occasionally. Get immediate medical attention. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools & equipment. Reduce airborne dust & prevent scattering by moistening w/ water. Pick up spill for recovery or disposal & place in a closed container.</p> <p>Storage: Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition, protect from moisture and incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings & precautions listed for the product.</p>

Table A-1 (continued) – Roll-up of Toxicology Information, ACGIH-Compiled TLV Information, and Environmental, Safety and Occupational Health (ESOH) Information for Energetic Ingredients Contained in 12 Gauge and 40mm Warning Munitions Proposed for Use During Phase 3 TBRL Experiments at the ARDEC Helipad

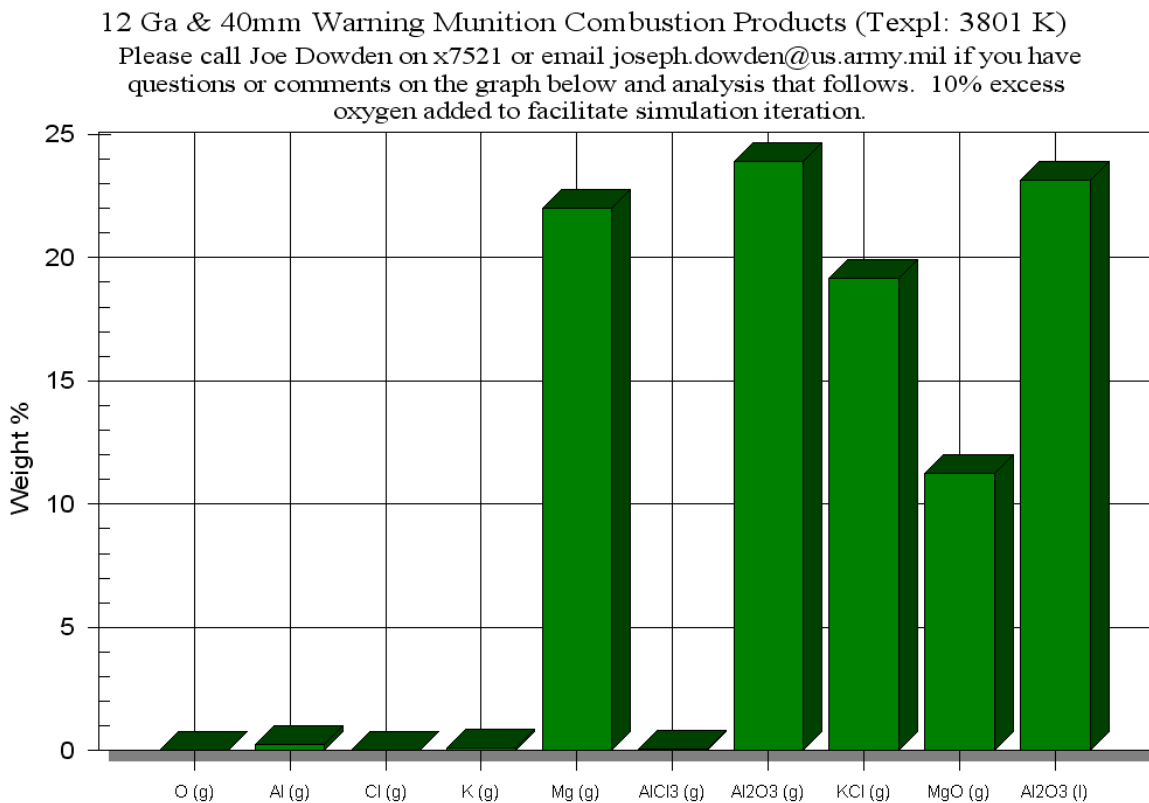
<u>Composition / Constituents</u>	<u>National Toxicology Program (NTP)</u>	<u>ACGIH Threshold Exposure limits/OEL (8-Hour TWA)</u>	<u>IARC Threshold Exposure limits</u>	<u>NIOSH Threshold Exposure Limits/ TWA</u>	<u>Carcinogenicity / Animal Studies, & Incompatibilities</u>	<u>OSHA mg/m³ Threshold Exposure limits / PEL Carcinogen* & Note(s) on Flammability</u>	<u>Suggested PPE</u>	<u>Notes; (e.g., Disposal/ Transportation Health Hazards: Exposure Routes (ER), symptoms (SY), target organs (TO)</u>
Potassium Perchlorate (forms KCl from function of 12 Gauge or 40mm Warning Munitions)	No	10 mg/m ³ TWA	None	None	Investigated as reproductive effector. No long-term animal studies have been performed to evaluate carcinogenic or mutagenic potential of potassium perchlorate. One or more animal studies show brain, nervous system, or behavioral effects at moderate doses. In 1995 and since 1995, EPA found animal studies have linked perchlorates to thyroid problems and a particular embryo-fetal toxicity issue at low doses. 28 parts per billion action level for drinking water under consideration. Reversible corneal opacity and severe irritation observed in rabbits following single 0.1 gram dose, irritation persisted in 5/6 animals at 7 days post-exposure.	10 mg/m ³ TWA (total); Firefighting Measures: Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Fire: Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition, may act as initiation source for dust/vapor explosions. Explosions: Strong oxidants may explode when shocked, or if exposed to heat, flame or friction. May act as initiator for dust explosion. Avoid storage on wooden floors. Containers may explode when involved in a fire. Sensitive to mechanical impact. Fire extinguishing media: Flood with large amounts of water.	Use in adequately ventilated area. For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible or not performing sufficiently, a particulate respirator (NIOSH Type N95 or better filters) may be worn. If oil particles (e.g., lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH Type R or P filter. For emergencies or where exposure levels are not known, use full-face positive-pressure, air-supplied respirator. Skin: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Eyes: Use chemical safety goggles, maintain eyewash fountain and quick-drench facilities in area.	Eye: Causes redness, irritation, and pain, may cause burns. Skin: Causes irritation to skin, symptoms include redness, itching, and pain. May cause burns to skin tissue upon contact. First Aid: Flush eyes for ≥ 15 minutes. Ingestion: irritant to mucous membrane, causes gastrointestinal upset. Larger doses can cause nausea, vomiting, fever, rashes. Reduces O ₂ to body organs. Exposure causes red blood cell breakdown which could lead to kidney damage. May affect bone marrow (aplastic anemia). First Aid: Induce vomiting immediately by medical personnel, get medical attention. Inhalation: Causes respiratory tract irritation. Symptoms: Coughing, shortness of breath. High concentrations can cause pulmonary edema. First Aid: Remove to fresh air. Give artificial respiration if not breathing, give oxygen if breathing difficult. Accidental Release Measures: Remove all sources of ignition, ventilate area of leak or spill. Absorb in a manner that does not disperse dust into the air. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in suitable closed container. Avoid runoff into storm sewers & ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation. Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances (i.e., combustibles, organics, other readily oxidizable products). Store in cool, dry area. Previously filled empty containers may be hazardous due to product residue (dust, solids) retention. Maintenance: Use non-sparking tools and equipment.

APPENDIX B

Combustion Product Analysis for Representative 40mm and 12-Gauge Shotgun Shell-Sized Warning Munitions

12 Gauge and 40mm Warning Mmunition Combustion Product Analysis

Refer to Figure A-1 below for a graphical depiction of the 12-gauge and 40mm warning munition combustion products. The analysis of regulated 12-gauge and 40mm warning munition combustion products is presented following Figure A-1. For each analysis, the combustion products are based on the per-round quantity of energetic material in the 12-gauge warning munition (3.5 grams) and the 40mm warning munition (6.96 grams). For the 12-gauge and 40mm warning munitions, the energetic material is a pyrotechnic composition composed of 28% Aluminum, 32% Magnesium, and 40% Potassium Perchlorate. 10% excess oxygen (47.62% excess air) was added to facilitate simulation iteration.



12 Gauge Warning Mmunition Regulated Combustion Product Analysis

For this analysis, approximately 99.83% of the aluminum was converted to gaseous or liquid aluminum oxide (Al₂O₃).

Approximately 0.98 grams of aluminum in aluminum compounds is released from function of each 12-gauge warning munition, with approximately 49% or approximately 0.478 grams in liquid form and 51% or approximately 0.498 grams in gaseous form. This quantity of gaseous aluminum will dissipate to within its 8-hour TWA PEL compliance level of 1.0 mg/m^3 when a volume of approximately 498 m^3 (equivalent to a sphere slightly larger than 4.917 meters in radius) is occupied.

Approximately 1.12 grams of gaseous magnesium or magnesium in magnesium oxide gas is released from function of each 12-Gauge warning munition. It is anticipated that the gaseous magnesium will react to form additional magnesium oxide, such that an approximate total 1.671701 gram quantity of MgO will be released. This quantity of gaseous magnesium oxide will dissipate to within its 8-hour TWA PEL compliance level of 10 mg/m^3 when a volume of approximately 167.1 m^3 (equivalent to a sphere slightly larger than 3.416 meters in radius) is occupied.

Approximately 0.6715 grams of potassium chloride, which is not regulated by the American Conference of Governmental Industrial Hygienists (ACGIH), will also be released from function of each 12-gauge warning munition. A review of MSDSs for potassium chloride did not yield information on airborne exposure limits. If an ACGIH value of 10 mg/m^3 for nuisance dust is considered, then the 0.6715 gram quantity of KCl will dissipate to within the nuisance dust 8-hour TWA PEL compliance level of 10 mg/m^3 when a volume of approximately 67.15 m^3 (equivalent to a sphere slightly larger than 2.521 meters in radius) is occupied.

A projection of the cumulative impact of all air contaminants described above for the predicted combustion products from firing each 12-gauge warning munition could be based on the sum of the “compliance volumes” for each air contaminant. For the 12-gauge warning munition this calculates to approximately 732.25 cubic meters (equivalent to a sphere approximately 11.182 meters in diameter). This quantity of Fraunhofer Institute Chemische Technologie ICT Thermodynamic code combustion products from the 12 Gauge Warning Munition will dissipate to within compliance levels at distances approaching 5.5914 meters from the initiation location.

40mm Warning Munition Regulated Combustion Product Analysis

For this analysis, approximately 99.83% of the aluminum was converted to gaseous or liquid aluminum oxide (Al_2O_3). Approximately 1.9488 grams of aluminum in aluminum compounds is released from function of each 40mm warning munitions, with approximately 49% or approximately 0.955 grams in liquid form and 51% or approximately 0.994 grams in gaseous form. This quantity of gaseous aluminum will dissipate to within its 8-hour TWA PEL compliance level of 1.0 mg/m^3 when a volume of approximately 994 m^3 (equivalent to a sphere slightly larger than 6.191 meters in radius) is occupied.

Approximately 2.2272 grams of gaseous magnesium or magnesium in magnesium oxide gas is released from function of each 40mm warning munition. It is anticipated that the gaseous magnesium will react to form additional magnesium oxide, such that an approximate total 3.325955 gram quantity of MgO will be released. This quantity of gaseous magnesium oxide will dissipate to within its 8-hour TWA PEL compliance level of 10 mg/m^3 when a volume of approximately 332.6 m^3 (equivalent to a sphere slightly larger than 4.298 meters in radius) is occupied.

Approximately 1.335276 grams of potassium chloride, which is not regulated by the ACGIH, will also be released from function of each 40mm warning munitions. A review of MSDSs for potassium chloride did not yield information on airborne exposure limits. If an ACGIH value of 10 mg/m^3 for nuisance dust is considered, then the 1.335276 gram quantity of KCl will dissipate to within the nuisance dust 8-hour TWA PEL compliance level of 10 mg/m^3 when a volume of approximately 133.52 m^3 (equivalent to a sphere slightly larger than 3.17 meters in radius) is occupied.

A projection of the cumulative impact of all air contaminants described above for the predicted combustion products from firing each 40mm warning munitions could be based on the sum of the “compliance volumes” for each air contaminant. For the 40mm Warning Munition this calculates to approximately 1460.12 cubic meters (equivalent to a sphere approximately 14.0755 meters in diameter). This quantity of Fraunhofer Institute Chemische Technologie ICT Thermodynamic code combustion products from the 40mm Warning Munition will dissipate to within compliance levels at distances approaching 7.03774 meters from the initiation location.

APPENDIX C-RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

Target Behavioral Response Laboratory (TBRL)-Outdoor Behavioral Response
Tests at ARDEC's Helipad with 12-Gauge Shotgun Shell and 40mm Flash Bang
Simulators

U.S. Army Research, Development and Engineering Command (RDECOM-
ARDEC) Picatinny Arsenal (Morris County), New Jersey

INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule* in the 30 November 1993, Federal Register (40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). The U.S. Army Center for Health Promotion and Preventive Medicine published the *Technical Guide for Preparing a Record of Nonapplicability for the Conformity Rule*, in November 2003. These publications provide implementing guidance to document CAA Conformity Determination requirements.

Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the Federal agency to determine whether a Federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1 51.850[a]).

The general conformity rule applies to federal actions proposed within areas which are designated as either nonattainment or maintenance areas for a National Ambient Air Quality Standards (NAAQS) for any of the criteria pollutants. Former nonattainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The Proposed Action would occur within Morris County New Jersey. This county is currently in nonattainment of the 8-hour ozone (O_3) and $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 μm or less) NAAQS. The Morris County is in attainment (or simply hasn't been designated) status for NO_2 , SO_2 , Lead (Pb), and PM_{10} . Therefore, only project emissions of ozone (since ozone is not a direct emission, its precursors, volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]) and particulate matter are analyzed for conformity rule applicability. Table 1 illustrates the requirements:

TABLE 1. AIR POLLUTANTS SUBJECT TO A GENERAL CONFORMITY REVIEW¹

If the installation is located in an area designated as a Nonattainment or Maintenance area for...	Then a general conformity review must be performed for...
O_3	nitrogen oxides (NO_x) and volatile organic compounds (VOCs)
$PM_{2.5}$	$PM_{2.5}$ and $PM_{2.5}$ precursors such as acid gases or metals*

1. Tech Guide for Preparing a RONA for the Conformity Rule, USACHPPM, 2003

The annual *de minimis* levels for this region are listed in Table 2. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels (40 CFR Part 1, Section 51.853[b]) and are not regionally significant (totals less than 10 percent of projected regional emissions for that pollutant) (40 CFR Part 1, Section 93.153). Since Morris County is within the Ozone Transport Region, the *de minimis* values for VOCs are 50 tons and 100 tons for NOx.

TABLE 2. GENERAL CONFORMITY POLLUTANT THRESHOLD RATES (TONS PER YEAR)¹

Pollutant	Tons/Year
O₃ (Volatile Organic Compounds [VOC] or Nitrogen Oxides [NOx])	
Serious	50
Severe	25
Extreme	10
Marginal and Moderate O₃ nonattainment areas inside an O₃ transport region	
VOCs	50
NOx	100
Particulate Matter	
Moderate and Maintenance Areas	100
Serious	70

¹ Source: 40 CFR 51

PROPOSED ACTION

Action Proponent: TBRL of the Quality Engineering and System Assurance Directorate (QE&SA), RDECOM-ARDEC proposes to conduct tests of the 12 Gauge shotgun shell-sized flash/bang simulator munitions (containing 3.5 grams of energetic material), and the 40mm flash/bang simulator munitions (containing 6.96 grams of similar energetic material). In addition golf carts will be operated and driven in proposed driving tests around a prescribed course with pre-placed flash and bang simulator munitions at the former NJATRNG Helipad.

Location: TBRL of the Quality Engineering and System Assurance Directorate (QE&SA) at the former ARDEC Helipad located near the 3500 Area of RDECOM-ARDEC, Picatinny Arsenal, New Jersey

Proposed Action Name: ARDEC proposes to conduct behavioral response tests and evaluate by the Target Behavioral Response Laboratory (TBRL) Outdoor Behavioral Response Tests at ARDEC's Helipad with 12—Gauge Shotgun Shell and 40mm Flash-Bang Simulators.

Proposed Action & Emissions Summary: The Proposed Action may take place within a two year and seven month timeframe. Operation of the test facility will produce no addition to Picatinny Arsenal's current emissions of air pollutants. Emissions of air pollutants resulting from operation of the outdoor tests are identical to current values. The only net effects will occur as a result of the test activities required to conduct the test at the former Helipad in the 3500 Area. This project is envisioned to last until FY 2014 when it is planned to convert the former helipad into a solar cell array field.

Annual emissions from all test activities were calculated by assuming that test activities would occur within the two year and seven-month timeframe.

Estimated test emissions due to implementation of the Proposed Action are shown in Table 3. Based on the air quality analysis for the Proposed Action, the maximum estimated emissions would be below conformity *de minimis* levels and would be less than 10 percent of projected regional emissions.

Table 3. Estimated Total Net Project Emissions – Tons per Year

Emission Source	Pollutant (tons/year)		
	VOC	NO _x	PM _{2.5}
NONROAD RECREATIONAL VEHICLE & ENGINES– Gasoline Powered 4-cycle engine Golf car* EZ Go Golf Cart Model: H2797	0	0	0
Total Emissions	unavailable	<1	unavailable
<i>de minimis</i> threshold	50	100	50
Exceeds <i>de minimis</i> threshold?	No	No	No

Affected Air Basin: Morris County, New Jersey

Emission data on the 1997 Model Year EZ-Go golf cart to be used during the proposed TBRL Phase 3 experiments at the ARDEC Helipad are not contained in the operator's manual, per discussion with the TBRL. Textron Corporation, the EZ-Go golf cart manufacturer, was also contacted; emission data is not available. It is noted that the 1997 EZ-Go golf cart is powered by a 4-cycle engine, approximately 9 Horsepower (HP) and 400 cc (approximately 24.4 cubic inches) in size. It is also noted that the RONA Table 3 calls for emission data on volatile organic compounds (VOC's), nitrogen oxides (NO_x's), and particulate matter of 2.5 microns in size (PM_{2.5}). It is anticipated that there will be a negligible contribution of PM_{2.5} from operation of the golf carts during the proposed Phase 3 TBRL testing.

TBRL has advised that the total mileage for the golf carts during the Phase 3 experiments will be approximately 300 miles, which translates to approximately 20 hours of operation at an estimated speed of 15 miles/hour.

Data from the Consumer Reports website lists an estimated generation of 17.6 grams of hydrocarbons + NO_x's, per HP per hour (separate data for hydrocarbons and NO_x's is not available). Separate data for VOC's and PM_{2.5} is also not available. For the 9 HP EZ-Go golf cart operating for 20 hours during the TBRL Phase 3 experiments, this translates to a total estimated 3168 grams of hydrocarbons + nitrogen oxides (approximately 7 pounds) combined, to be generated during the TBRL phase 3 experiments (17.6 X 9 X 20 = 3168). This estimated total represents an infinitesimal addition to the Arsenal-wide "de minimis" threshold of 100 tons/year for NO_x's set forth in the RONA.

Date RONA Prepared: 28 July 2011

RONA Prepared by: U.S. Army Research, Development and Engineering Command

Proposed Action Exemption:

Provisions in the General Conformity Rule (Section 51.853(c) (1)) allow for exemptions from performing a conformity determination if total emissions of individual non-

attainment or maintenance area pollutants resulting from a proposed action fall below specific threshold values (*i.e.*, *de minimis* levels) or would result in no emission increase. As discussed above, the change in the levels of NO_x and VOCs caused by the proposed action to conduct tests involving driving maneuvers of gas powered golf carts would involve either emissions below *de minimis* levels or result in no emissions increase. Therefore, the proposed action is exempt from requirements under the General Conformity Rule.

To the best of my knowledge, the information provided is correct and accurate and I concur in the finding that the proposed testing in the 3500 Area near former NJANG Helipad will conform to the New Jersey State Implementation Plan.

RONA Approval:

Signature: _____ Date: _____

Name/Rank: _____

FINDING OF NO SIGNIFICANT IMPACT

1. Project Identification: Phase 3 Outdoor Testing By The Target Behavioral Response Laboratory (TBRL) at the ARDEC Helipad, Picatinny Arsenal.

2. Description of Proposed Action:

TBRL has been tasked to conduct outdoor behavioral response tests at the former New Jersey Army National Guard (NJARNG) Helipad to assess the behavioral response of test subjects to shotgun shell-sized flash and bang simulator munitions while performing task-oriented driving maneuvers (e.g., approaching a mock vehicle control point), and also to include driving golf cart-type vehicles around a prescribed marked Figure "8" 570 foot perimeter test course set up at the Helipad. One 12-gauge or 40mm simulator munitions will be set up at the center of the Figure "8" test course. The current TBRL plan is to plan and pilotize the experiment between March – June 2011, and to conduct approximately 5 tests daily (3 daytime, 2 nighttime) over a 12-week period in FY12 during daylight and evening hours, and to complete these tests before a planned conversion of the former helipad into a solar cell array field in FY 2014.

These tasks are required by the Army, and will be conducted by the TBRL of the Quality Engineering and System Assurance Directorate (QE&SA), at the former NJARNG Helipad located adjacent to the 3500 Area of RDECOM-ARDEC.

3. Discussion of Anticipated Environmental Effects:

This Environmental Assessment (EA) was written for staffing for a series of outdoor experiments TBRL has been tasked to perform to assess the response of test subjects driving a vehicle around a prescribed course to randomly activated 12-gauge and 40mm warning munitions.

Affected environments will be air, ground and water located at the former NJARNG Helipad (tarmac only) of RDECOM-ARDEC adjacent to the TBRL facilities, Picatinny Arsenal, NJ.

a. The impact on air quality from conducting the outdoor behavioral response testing will be insignificant, and will be limited to emissions from gasoline powered and diesel powered vehicles and generators. There will be small airborne releases of aluminum oxide, magnesium oxide, and potassium chloride from the function of energetic materials during the Phase 3 outdoor experiments at the TBRL. The "compliance volume" with respect to 8-hour Time Weighted Average (TWA) Permissible Exposure Level (PEL) data established by the American Conference of Governmental Industrial Hygienists (ACGIH) occupied by the gases generated from function of the 12-gauge warning munitions is a sphere with a radius of 5.5914 meters, and for the 40mm munitions, the corresponding "compliance volume" for the 40mm Warning Munitions is a sphere with a radius of 7.0377 meters.

b. Water quality is not expected to be significantly impacted by the outdoor behavioral response testing. The release of airborne gaseous combustion products aluminum oxide and magnesium oxide will rapidly dissipate to below 8-hour TWA PEL exposure levels set forth by the ACGIH. In regards to generation of a small quantity of an estimated 0.478 grams of liquid magnesium per 12-gauge warning munitions

functioned, an estimated 0.955 gram of liquid magnesium per 40mm warning munitions functioned, for the total estimated five (5): 12-gauge warning munitions and five (5): 40mm warning munitions that will be functioned each day, a combined total of approximately 7.165 grams of liquid magnesium will be emitted each day during the proposed Phase 3 Outdoor Testing at the former NJARNG Helipad by the TBRL. Magnesium is an essential body mineral, and it is noted that the kidneys are efficient at excreting excess magnesium. Moreover, there is a documented mandated procedure for daily clean-up of warning munition residue in place, and set forth in the Building 3518 Stormwater Pollution Prevention Plan. Acute LD₅₀ data has not been identified for magnesium; however acute LD₅₀ data for table salt (e.g., sodium chloride) of 3.0 grams/kilogram body weight has been published. Magnesium is also the most galvanically active metal and will readily break down; it is therefore unlikely that any significant quantity of magnesium will leach into underground and pollute ground water aquifers.

c. No hazardous metallic materials (e.g., heavy metals such as lead, chromium, nickel, and tungsten) are identified as ingredients or energetic ingredients in the 12-gauge and 40mm warning munitions proposed for use by TBRL during the proposed Phase 3 outdoor experiments at the former NJARNG Helipad.

d. Noise levels will be consistent with site specific requirements of the TBRL testing facilities. They will pose no threat to the quality of the environment, and based on investigation of adverse effects on endangered species (including the Indiana Bat) from similar and louder noise profiles from high caliber weapons fire at another Army installation and also prior operation of ARDEC's Ballistic Rail Gun, are not expected to adversely affect Indiana Bat populations or behavior. The health of test subjects and test operating personnel will be ensured by adherence to procedures established for the operation of 12-gauge and 40mm warning munitions, including the wearing of appropriate hearing protection.

4. Conclusions:

Based on preparation of this EA, the proposed Phase 3 outdoor TBRL testing and experimentation at the former NJARNG Helipad will not significantly impact the environment. The following determinations for this program are noted:

- a. It is not an action that will significantly affect the quality of the human environment.
- b. It will not have a significant impact on the environment.
- c. It is not likely to be environmentally controversial.
- d. It does not require an environmental impact statement.

5. Point of Contact (POC) for Public Comments:

Commander
U.S. Armament Research, Development and Engineering Center (ARDEC),
Public Affairs Office
ATTN: Mr. Peter Rowland, RDAR-AO
Bldg. 1
Picatinny Arsenal, NJ 07806-5000

6. Public Comment Period:

Comments regarding these findings should be forwarded to the POC within thirty (30) days of public notification.